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(54) Improved dairy spreads

(57) A process for the production of a water-in-oil emulsion dairy spread comprises preparing a fat phase, preparing an aqueous phase, and emusifying the fat phase and the aqueous phase together. The preparation of the aqueous phase includes the step of blending an intermediate cheese product with a milk based liquid, emulsifying salts and salt, to a total solids content of 10 to 14% by weight and a pH value of between 6 and 7. The intermediate cheese product used in the preparation of the aqueous phase may be cheese base or cheese curd.

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SPECIFICATION

A process for the production of dairy spreads and improved dairy spreads

The present invention relates to a process for the production of dairy spreads and dairy spreads produced from such a process and more particularly to dairy spreads which have a high protein and a low fat content and are suitable for substitution in place of butter or margarine in domestic use.

Typically, a dairy spread having a high protein and low fat content is a water-in-oil emulsion which is produced by emulsifying together two separately prepared phases, a fat phase and an aqueous phase to which protein has been added.

The protein added to the aqueous phase can be of animal or vegetable origin but is usually derived from cows' milk. The main protein in milk is casein. Milk produced in Ireland has between 2.7 to 4% by weight of casein in the milk. Also included in milk are fat (between 3% and 5% by weight), carbohydrates in the form of milk sugar (lactose), vitamins, and minerals such as calcium. Lactose can be converted into lactic acid by bacteria present in the milk, thus resulting in souring of the milk. Conventionally, the protein of the aqueous phase is first isolated, for example by acid precipitation and then purified.

A number of disadvantages are associated with the conventional process. The process is time consuming and can lead to loss of both flavour and valuable nutrients. Acid precipitation gives a good precipitation of casein proteins but only precipitates approximately one third of the whey proteins. Whey proteins have a high nutrient value and the loss of two thirds of the whey proteins decreases the nutrient value of the final product. Also, due to the use of a considerable amount of acid, the product obtained is somewhat sour in flavour. U.S. Patent Specification No. 4,051,269 (Mjolkcentralen, Arla Ekonomisk Forening) discloses a process which attempts to overcome the above disadvantages. That specification teaches a process for the production of proteins for the aqueous phase of a water-in-oil emulsion from sweet or only slightly soured milk products which preferably have a pH-value between 6.0 and 7.0. In order to obtain a concentrate of both the casein proteins and all or almost all of the whey proteins, the milk is subjected to a concentration process which retains the proteins in stable suspension; preferably by removal of a portion of the water from such products by a membrane process such as ultra filtration. By such a process, it is possible to retain practically all of the milk proteins, i.e. both the casein and the whey proteins. The protein concentrate obtained has a protein content of between 9 and 24% by weight.

The chief disadvantage associated with the process of U.S. Patent Specification No. 4,051,269 is that the protein concentrate produced has a short storage life, perhaps a maximum of two days unless a concentrate is pasteurised and aseptically packaged. Ideally the protein concentrate should go forward to the emulsifying stage with the fat phase almost immediately after production.

The object of the present invention is to alleviate the above described disadvantages.

The present invention provides a process for the production of a water-in-oil emulsion dairy spread comprising the steps of:

preparing a fat phase, preparing an aqueous phase, and emulsifying the fat phase and the aqueous phase together, characterized in that the preparation of the aqueous phase includes the step of blending an intermediate cheese product with a milk based liquid, emulsifying salts and salt, to a total solids content of 10 to 14% by weight and a pH value of between 6 and 7.

Preferably, the intermediate cheese product is either cheese curd or cheese base.

When milk is standardised to have a defined fat: total solids ratio, then thermised (for example by pasteurisation) and finally concentrated by ultrafiltration and evaporation to approximately 60–65% solid content, a concentrate is obtained which contains all of the proteins found in milk and which is known as "cheese base". The invention is based on the discovery that this concentrate, in combination with buttermilk, water, or other liquid such as for example whole milk, including emulsifying salts and preservatives where necessary, constitutes an aqueous phase ideally suited for use in the preparation of a dairy spread of the kind referred to, the spread having a distinctive flavour and being high in nutritional value and protein as compared with other low fat spreads.

The cheese base may be produced at the same time as the production of the diary spread or it may be produced and stored until required. Furthermore, the cheese base may be produced remote from the site of production of the diary spread and transported to that site. By virtue of the fact that cheese base is readily transportable and can be stored for months, the production of diary spreads is greatly simplified.

Cheese curd may be used instead of cheese base to form the aqueous phase, cheese curd also being storable and transportable. The use of the cheese base concentrate or cheese curd elminates the need to precipitate the protein, not only simplifying the production process, but resulting in a spread of improved characteristics.

The invention will now be more specifically described by way of example.

The fat phase is ideally a blend of hard fat and soft fat. The hard fat fraction may be

butter, hydrogenated vegetable fat or partially hydrogenated vegetable fat or a combination of one or more of such fats with fats from an animal, vegetable or fish source. The soft fat fraction may be fractionated butter fat and vegetable oils or a combination of fats from an animal, vegetable or fish source.

The fat phase may also be prepared using melted butter, butter oil or a fraction thereof, inverted cream and/or vegetable, animal or fish oils, both hard and soft.

The blend of fats used to make up the fat phase can be such that when combined with the aqueous phase, a product is obtained which is frigospreadable (i.e. spreadable when taken from a refrigerator) and typically has a solid fat content of 26–34% (as measured by Nuclear Magnetic Resonance).

Alternatively; a non-frigospreadable product can be obtained by increasing the solid fat content of the blend.

In a preferred process, the blend of fats is melted and heated to 60°C or higher until pasteurisation has occurred, the ingredients are mixed thoroughly in a mixing tank and cooled to a temperature of 50°C or lower and stored. Examples of suitable emulsifiers are monoglycerides, diglycerides, triglycerides and lecithin.

The aqueous phase is prepared by using an intermediate cheese product either cheese base (Preparation A) or cheese curd (Preparation B).

PREPARATION A

The cheese base concentrate is prepared by the Pasilac technique (see for example U.K. Patent Specification No. 2101866 in the name Pasilac A/S).

A preservative, e.g. sorbic acid or potassium sorbate, can be added if necessary to inhibit bacterial deterioration. The prepared cheese base is melted or shredded, and blended with buttermilk (or some other suitable liquid), emulsifying salts and salt to a final total solids content of typically 10–14% and at a temperature of 65–125°C, but more usually 85–100°C, and a pH value of 6–7. The aqueous phase is then cooled to 50°C or lower.

PREPARATION B

Cheese curd is blended with a suitable liquid such as cultured buttermilk, and salt and emulsifying salts are added. This mixture is pasteurised as in Preparation A and cooled to 50°C or lower. Preservative may also be added.

The aqueous phase derived using Preparation A or B is then slowly added to the previously prepared fat phase in a closed system. The two phases are then vigorously agitated to form a water-in-oil emulsion. Great care must be taken to ensure correct agitation, and the addition of the aqueous phase to the fat phase must take place at a controlled rate of flow.

When the water-in-oil emulsion is formed it is then cooled and crystallised in a tube chiller, an apparatus of the kind known as a scraped surface heat exchanger. The product crystallises at a temperature between 2 and 15°C, and is then ready to be packaged.

It should be emphasised that the temperatures, temperature ranges, solid fat content ranges, pH values and other specific figures mentioned above are given essentially to illustrate the invention and can vary within the scope of the invention.

EXAMPLE 1

Fat Phase

Butter	50	kg
Butter oil	18	kg
Emulsifier	1	kg
Colour	0.01	kg

The butter and butter oil are melted and heated to 60°C. Emulsifer and colouring are added and the fat phase is then cooled to, and maintained at, 40°C.

Aqueous Phase (Preparation A)

Cheese Base	38.7	kg
Cultured Buttermilk	44.7	kg
Water from Butter	8.0	kg
Salt	1.5	kg
Emulsifying Salt	0.4	kg

The cheese base is blended with buttermilk and then mixed with the other ingredients. The resulting ph is 6.9. The pasteurisation temperature is 93°C and the aqueous phase is cooled and held at 40°C.

The aqueous phase is introduced into the fat phase whilst both are at a temperature of 40°C, the emulsion temperature being 39°C. The temperature of the product leaving the scraped surface heat exchanger is 12°C.

EXAMPLE 2

Fat Phase

Butter	50.00	kg
Butter oil	8.05	kg
Emulsifier	1.00	kg
Colouring	0.01	kg

The butter and butter oil are melted and heated to 60°C. Emulsifier and colouring are added and the fat phase is then cooled and maintained at 40°C.

Aqueous Phase (Preparation B)

Cheese curd	35.52	kg
Cultured Buttermilk	53.085	kg
Salt	2.00	kg
Emulsifying salt	0.807	kg

The cheese curd is blended with the three remaining ingredients to form the aqueous phase, the pH of which is 6.72. Pasteurisation and homogenisation take place at a tempera-

ture of 65°C and a pressure of 3000 p.s.i. and the aqueous phase is held at 40°C, while the emulsion temperature is 39°C. The temperature of the product leaving the scraped surface heat exchanger is 13°C.

EXAMPLE 3

Fat Phase		
Vegetable fat (Soya oil and hydrogenated soya oil)	59	kg

The ratio of hydrogenated soya oil to soya oil is adjusted in order to give an end product that is frigospreadable.

Emulsifier	1	kg
Colour	0.02	kg

The vegetable fat is melted and heated to 60°C. Emulsifier and colouring are added and the fat phase is then cooled to, and maintained at, 40°C.

Aqueous Phase (Preparation A)		
Cheese Base	38.7	kg
Cultured Buttermilk	53.4	kg
Salt	1.5	kg
Emulsifying Salt	0.4	kg

The cheese base is blended with buttermilk and then mixed with the other ingredients. The resulting pH is 6.9. The pasteurisation temperature is 93°C and the aqueous phase is cooled and held at 40°C.

The products resulting from the processes described in Examples 1 to 3 are frigospreadable, bear a good resemblance to butter both in flavour and appearance, and have a good shelf-life. The product incorporating cheese base differs slightly in flavour from that incorporating cheese curd, the cultured milk flavour from the cheese curd manifesting itself in the end product.

CLAIMS

1. A process for the production of a water-in-oil emulsion diary spread comprising the steps of:

preparing a fat phase, preparing an aqueous phase, and emulsifying the fat phase and the aqueous phase together, characterized in that the preparation of the aqueous phase includes the step of blending an intermediate cheese product with a milk based liquid, emulsifying salts and salt, to a total solids content of 10 to 14% by weight and a pH value of between 6 and 7.

2. A process for the production of a water-in-oil emulsion dairy spread as claimed in Claim 1, wherein the intermediate cheese product is cheese curd.

3. A process for the production of a water-in-oil emulsion diary spread as claimed in Claim 1, wherein the intermediate cheese product is cheese base.

4. A process for the production of a water-in-oil emulsion dairy spread as claimed in Claim 3, wherein the preparation of the cheese base includes the steps of standardising and thermising whole milk, concentrating the milk by ultrafiltration and evaporation to obtain a cheese base having between 60 to 65% total solids by weight.

5. A process for the production of a water-in-oil emulsion dairy spread as claimed in Claim 4, including the step of diafiltering the milk to reduce lactose levels.

6. A process for the production of a water-in-oil emulsion dairy spread as claimed in Claim 4 or Claim 5, including the steps of adding an acid culture to the cheese base and incubating the cheese base so as to improve the flavour of the final product.

7. A process for the production of a water-in-oil emulsion diary spread as claimed in any one of Claims 4 to 7, including the step of adding a preservative to the cheese base.

8. A process for the production of a water-in-oil emulsion dairy spread as claimed in any one of Claims 3 to 7, in which the preparation of the fat phase includes using a reduced fat content to compensate for the fat level of the cheese base.

9. A water-in-oil emulsion dairy spread comprising a fat phase emulsified with an aqueous phase characterized in that the aqueous phase includes an intermediate cheese product blended with a milk based liquid, emulsifying salts and salt, the aqueous phase having a total solids content of 10 to 14% by weight and a pH value of between 6 and 7.

10. A water-in-oil emulsion dairy spread as claimed in Claim 9, in which the intermediate cheese product comprises cheese curd.

11. A water-in-oil emulsion diary spread as claimed in Claim 9, in which the intermediate cheese product comprises cheese base.

12. A water-in-oil emulsion dairy spread as claimed in Claim 11, in which an acid culture has been added to the cheese base which has been incubated so as to improve the flavour of the final product.

13. A process for the production of a water-in-oil emulsion dairy spread substantially as described in the Examples.

14. A water-in-oil emulsion dariy spread whenever prepared by a process as claimed in any one of Claims 1 to 8 or 13.

15. A water-in-oil emulsion dairy spread substantially as described in the Examples.

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